

Health Consultation

Parcel E Landfill Fire at Hunters Point Shipyard

HUNTER'S POINT NAVAL SHIPYARD
(a/k/a TREASURE ISLAND NAVAL STATION-HUNTER'S POINT ANNEX)

SAN FRANCISCO, SAN FRANCISCO COUNTY, CALIFORNIA

EPA FACILITY ID: CA1170090087

MARCH 2, 2001

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

Public Health Service

Agency for Toxic Substances and Disease Registry

Division of Health Assessment and Consultation

Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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HEALTH CONSULTATION

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Prepared by:

Federal Facilities Assessment Branch
Division of Health Assessment and Consultation
Agency for Toxic Substances and Disease Registry

STATEMENT OF ISSUES

PURPOSE

The U.S. Environmental Protection Agency Region IX requested the Agency for Toxic Substances and Disease Registry (ATSDR) to determine the public health impact on nearby residents of the August 16, 2000 fire at the Parcel E Landfill on the Former Hunters Point Naval Shipyard. Environmental data is not available for the time period during the fire to determine the exact level of contaminants to which people may have been exposed. Air sampling data were collected 15 days after the fire and continue to be collected daily. The two specific questions ATSDR will address in this health consultation are 1) whether people could experience adverse health effects from exposure to contaminants released from the fire and 2) whether the landfill continues to emit contaminants after the fire at levels likely to pose a health hazard. The questions relate to two specific periods of time: during the fire and after the fire.

FINDINGS

1. During the fire, components (chemical and particulate) released from the fire on August 16 could have caused short-term adverse health effects in those people exposed. Health effects could include burning, itching or watery eyes and sinuses, headache, nausea, breathing difficulty and asthma-like symptoms. Individuals highly sensitive to the effects would be anyone with previous respiratory conditions such as asthma or emphysema, children, and the elderly. Health effects would have developed within a few days after exposure and lasted no more than two to three weeks.
2. After the fire, air sampling data collected 15 days after the fire was contained, but during the smoldering and since that time do not indicate a release of chemical or physical components likely to result in adverse health effects. Therefore, the landfill did not continue to emit contaminants posing a health hazard.

BACKGROUND

At 11:30 am on August 16, 2000, Hunters Point Shipyard base security notified the Federal Fire Department located at Hunters Point Naval Shipyard of a fire burning on the Parcel E Landfill^{1,2}. The Federal Fire Department along with the San Francisco Fire Department used water to contain the fire after approximately six hours². Approximately 37 percent of the landfill area burned. The firefighters reported that the fire produced white smoke and appeared to be a normal brush fire with no appearance of chemicals burning³. The San Francisco Bureau of Fire Investigation completed an investigation of the fire, but could not determine the cause of the fire⁴. The San Francisco Department of Health who tested the firefighters for exposure to radioactive material, found no

radioactive release³. After the 14-acre fire was put out, hot spots continued to smolder at depths less than one foot beneath the ground surface of approximately 5 acres². The Federal Fire Department continued to respond to the fire. Smoldering lasted for one month until construction/digging activities began on the landfill cap⁵.

Firefighters reported the color and characteristics of the smoke as being a brush fire as evident by charred scrub brush and grasses that grow on the landfill². However, a bystander reported seeing green, yellow and orange smoke⁶. On August 24, 2000, eight days after the fire was extinguished, a firefighter reported that a puff of green/yellow smoke was released when he shoveled some smoldering material². Photographic and video documentation of the fire show only white smoke coming from the burning grasses, bushes, and scrub growing on the landfill. A small pile of railroad ties to be used for repair of the rail line also caught fire⁵.

History and Location

Hunters Point is on a long promontory in the southeastern portion of San Francisco, extending eastward into San Francisco Bay (Figure 1). The facility is a deactivated shipyard bounded on the north and east by the bay, and on the south and west by the Bayview/Hunters Point community of San Francisco. The majority of the former shipyard, which totals 986 acres, consists of 493 acres of relatively flat lowlands constructed by placing fill materials along the bay's edge; 443 acres are under water. A small portion of the land is on a moderately to steeply sloping ridge. Most of the lowlands are covered by asphalt paving and buildings. The non-paved open areas are either sparsely vegetated or bare soil⁷.

The Hunters Point Naval Shipyard was originally established as a commercial shipyard in 1870. The Navy acquired the property in 1941, eleven days before the attack on Pearl Harbor. From 1941 to 1974, the major activities were ship building, maintenance, and repair of naval ships and submarines⁸. Additionally, the facility was used for base housing, naval ordnance training exercises, radiological defense research, and research on exposure to radioactive fallout. In the mid 1950s the shipyard employed 8,500 civilians. The Navy deactivated the shipyard in 1974. In 1989, following the Navy's environmental investigations, the U.S. EPA placed the shipyard on its National Priorities List, thus, designating it a federal "Superfund" site⁹.

The shipyard was divided into six parcels, Parcels A-F (Figure 2) to more effectively manage environmental cleanup and transfer. Parcel A contained the housing structures on 88 acres. The finding of Suitability to Transfer documents have been signed and Parcel A is ready for transfer to the City of San Francisco. The remaining five parcels are in various stages of investigation and cleanup. Parcel B consists of 66 acres previously used for offices, commercial buildings, warehouses, and submarine drydocks. Parcel C consists of 79 acres used for industrial purposes including ship drydocks. Parcel D consists of 125 acres of industrial buildings, ship repair facilities, and a crane. Parcel E consists of 135 acres containing the industrial landfill. In the past, the radiological laboratory and bachelor enlisted housing building were located on Parcel E. Parcel F is made up of 443 acres of underwater property¹⁰.

Parcel E Landfill is a 46-acre industrial landfill which operated from 1958 to 1974. The landfill received liquid chemical waste, asbestos, domestic wastes and refuse, dredge spoil materials, sandblast grit solvent wastes, and low-level radioactive wastes from shipboard radium dials including electronic equipment⁷.

In 1974, the shipyard was placed on industrial reserve. Soon thereafter, the Navy leased most of the shipyard to a commercial ship repair company that operated as master caretaker/tenant. In 1986, when the Navy discovered the company committed many environmental law violations for improper waste disposal, they canceled their lease⁷. The company also reportedly disposed of unknown wastes in the landfill. A soil layer was put on the landfill at some time after 1974. The soil layer is not uniform in its thickness and portions of the landfill material are less than one foot below ground surface⁵.

Hunters Point Naval Shipyard was approved for closure and disposition by the Base Realignment and Closure (BRAC) Commission in 1991. Operational base closure was April 1, 1994. It is currently under caretaker status by the Naval Facilities Engineering Command, Engineering Field Division - Southwest, located in San Bruno, California. Portions of Hunters Point Naval Shipyard have already been leased to private parties. Because of the presence of hazardous materials resulting from past shipyard operations and the operations of a commercial machine shop that had leased Hunters Point Naval Shipyard from 1976 to 1986, the EPA placed the installation on the National Priorities List in 1989⁷.

Current Land Use

Hunters Point Naval Shipyard is currently known as "The Point" to more than 250 artists who lease space on site. It is one of the largest artist communities in the country. It is open to the public two times per year during "Open Studio" where artists show their work in their studios. Otherwise, access is restricted¹¹.

The nearest off-site homes are less than 800 feet from Landfill E in the community known as Bayview/Hunters Point¹². The Bayview/Hunters Point district is bounded by Newhall Street, US Highway 101, Bayview Park Road and San Francisco Bay to the north and Mendell Street, Evans Avenue, Polou Avenue, and the bay to the south¹³. The Bayview/Hunters Point community is made of homes within the 94124 zip code of San Francisco. Figure 3 shows the demographic breakdown of the community consisting of nearly 89 percent minority populations. Similar to many urban, industrial, minority communities across the U.S., Bayview/Hunters Point has higher than the national average rates of asthma, respiratory disease, breast cancer, and diabetes^{14,15}. Therefore, they are considered a vulnerable population and may be more sensitive to the effects of exposure to hazardous substances.

Hunters Point Naval Shipyard was constructed on fill material and the majority of the base is just 10 feet above sea level. The western edge of the base slopes moderately steep. The Main Gate sits approximately 40 feet above sea level (Figure 4).

After the fire, the Navy began construction of a landfill cap over slightly more than the 14 acres where the fire was located, but not over the entire landfill. The cap, consistent with the requirements of the Resource Conservation and Recovery Act (RCRA), is designed to prevent future combustion within the burn area by preventing oxygen from getting into the landfill from the outside. Completion of the cap, including the planting of a vegetative cover, is anticipated to be complete at the end of January 2001¹⁶. The Navy is conducting subsurface monitoring of the landfill to ensure the smoldering areas are completely extinguished. Preliminary results of the sampling indicate no smoldering within the landfill material. The Navy expects to complete this evaluation in February 2001⁴.

DISCUSSION

Because data collection was not conducted at the time of the fire, ATSDR used mathematical models to assist us in determining probable areas where residents of Hunters Point Bayview or people working at the Hunters Point Naval Shipyard could have been exposed to the components of the fire. Mathematical modeling helped ATSDR determine the geographical areas where people were possibly exposed. Models help us estimate extent of the boundaries of exposure to the fire components. Two different models were used and the result combined. One model used the information about the high temperature of the fire which produced a lifting effect, the other model used the wide lateral extent of fire at ground level. (Figure 5). Additionally, ATSDR estimated the degree of exposure during the month long smoldering event (Figure 6). ATSDR used actual meteorologic data from San Francisco Airport, Oakland Airport, and San Francisco Physical Oceanographic Real-Time System¹⁷. The combination of the weather conditions during the 6-hour event combined with the high source temperature (fire), source characteristics such as, the large size of the source (14 acres), and the fact this plume is based on a very short span of time, resulted in temperatures high enough to lift the smoke plume and disperse contaminants downwind from the source and over the bay. Lower temperatures, smaller source area, changing wind directions, and other meteorological characteristics contributed to a more circular pattern during the month-long smoldering. Since the actual concentration of contaminants is not known, the values are noted in terms of percent of the maximum source concentration.

To determine the health impact of the fire on nearby residents and workers, ATSDR relied on information from other landfill fires, railroad tie fires, forest, and wildland fires across the country to determine possible components of the fire and smoke at Hunters Point Naval Shipyard. Additional information about the fire components possibly released into the air were ascertained from Hunters Point Shipyard surface soil, soil rinsate, and surface water analysis. We also examined meteorological data about conditions at Hunters Point Naval Shipyard at the time of and following the fire. The following discussion will address two aspects: 1) potential human exposure to general combustion products during the fire and 2) human exposure to measured contaminants from data collected after the fire, during the smoldering event.

Information about the health of forest and wildland firefighters and people exposed to brush fires landfill fires, and burning railroad ties in other places across the country provided information about the possible health consequences that could occur in people in the Bayview Hunters Point community.

Local information about the general health status and demographic makeup of the people possibly exposed to the Hunters Point Naval Shipyard Parcel E landfill fire identifies those people who may be more sensitive to the effects of exposure to the fire. Information about the health of the individuals within Bayview/Hunters Point community was provided by the San Francisco Department of Public Health who obtained reports from local clinics, doctors offices, and hospitals before and after the fire.

Human Exposure to General Combustion Products

To address the question of whether people could experience adverse health effects from exposure to contaminants released from the fire, ATSDR first determined the chemical and physical components that were likely released from the fire. Without actual air data collected during the fire, ATSDR reviewed the available scientific literature of other landfill fires, wildfires, and prescribed burns.

Numerous groups including the U.S. Department of Agriculture Forest Service, Johns Hopkins University, University of Washington, U.S. Department of the Interior, National Park Service, Centers for Disease Control and Prevention; National Institute for Occupational Safety and Health, American Medical Association, American Industrial Hygiene Association, and various states have studied the components of fire and smoke and the health effects seen in firefighters over the last 12 years.

The main components of the fire that pose the greatest hazard by way of inhalation are carbon monoxide, carbon dioxide, aldehydes, (i.e., formaldehyde and acrolein) ozone, polyaromatic hydrocarbons (PAH)s, benzene (discussed in the following section), and respirable particulates^{18,19,20,21,22}.

Carbon Monoxide

Carbon monoxide is a colorless, odorless gas released during incomplete combustion (i.e., fire) which primarily affects the nervous system. Exposure to carbon monoxide can cause headache, dizziness, and lightheadedness. Exposure to low to moderate levels can affect concentration, cause memory and vision problems, loss of muscle coordination, temporary reduction in lung function, bronchitis, and asthma-like symptoms^{18,19,20,21}.

Carbon Dioxide

Carbon dioxide is a colorless, odorless gas released by our bodies when we exhale. Exposure to moderate amounts of carbon dioxide can cause lightheadedness, confusion, and loss of consciousness²¹.

Formaldehyde

Formaldehyde is a colorless, flammable gas with a strong, pungent odor. It can form explosive mixtures with air and oxygen. As an important industrial chemical of major commercial use, formaldehyde is found throughout the environment. In solution, it has a wide range of uses: in the manufacture of resins and textiles, as a disinfectant, and as a laboratory fixative or preservative. Formaldehyde is formed during incomplete combustion of hydrocarbons²². In outdoor air it can originate from many sources such as incinerators, photochemical smog, and engine exhaust. Atmospheric levels of formaldehyde have been reported to range from less than 0.005 ppm to 0.06 ppm near industrial outlets or in areas of heavy smog²³. Workers who smoke are exposed to additional levels of formaldehyde, since cigarette smoke contains as much as 40 ppm of formaldehyde by volume²⁴. The first signs or symptoms noticed from exposure to formaldehyde at concentrations ranging from 0.1 to 5 ppm are burning of the eyes, tearing, and general irritation to the upper respiratory passages. Higher exposures (10 to 20 ppm) may produce coughing, tightening in the chest, a sense of pressure in the head, and palpitation of the heart^{21,25,26,27}.

Acrolein

Acrolein is a colorless to yellow liquid which produces vapors with a foul choking odor. It is released from the burning of natural materials. Burning tobacco and other plants forms acrolein. People can also breathe acrolein when near automobiles, because burning gasoline forms acrolein, which enters the air^{21,22,23}. Oil or coal power plants also release small amounts of acrolein. Acrolein is formed when fats are heated. Small amounts of acrolein may also be found in foods such as fried foods, cooking oils, and roasted coffee. In several large cities acrolein has been measured at levels of 0.009 ppm²⁷. The levels in inside air can be much higher when tobacco is burning. For example, in a car with three people smoking and the windows closed, a person could breathe in 0.300 ppm. Acrolein can be smelled at levels above 0.160 ppm. So, a person would probably smell acrolein and notice eye, nose, and throat irritation before it harms the lungs²⁷.

Ozone

Ozone is a colorless gas with a sharp odor which can be smelled well below the permissible levels of exposure. At low exposure doses, an individual may experience irritation of the eyes, dryness of the nose and throat and cough. At moderate levels, headache, stomach ache and vomiting can occur. Ozone is the main component in smog that can cause breathing problems, aggravate asthma, and increases the severity and incidence of respiratory infections^{19,21}.

PAHs

Polycyclic aromatic hydrocarbons (PAHs) are a group of more than 100 different chemicals that are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances like tobacco or charbroiled meat. They are also found in railroad ties. The primary sources of exposure to PAHs for most of the U.S. population are inhalation of the compounds in tobacco smoke, wood smoke, and ambient air, and consumption of PAHs in grilled foods. Throat irritation, cough, and respiratory difficulties were noted in factory workers exposed to moderate levels of PAHs^{25,26,27}.

Particulates

Particulates are small pieces of material released from combustion or from physical release into the air. The effect particulates have on people when breathed in depends on the size of the particles. Larger particles (greater than 10 microns) get trapped by the nasal passages. Particles greater than 5 microns travel down the airway to the bronchioles and are removed by the cilia and by coughing. Respirable particles (0.5-5 microns) can travel deeper into the alveolar region of the lungs causing irritation, bronchitis and respiratory effects. Particles smaller than 0.5 microns do not usually stay in the lungs, but instead are exhaled²⁷. The legal airborne permissible exposure limit for workers is 50 ppm averaged over an 8-hour period²⁷.

Public Health Implications

The likelihood of becoming sick from chemical exposure increases as the amount of chemical exposure increases. This is determined by the length of time and the amount of chemicals to which someone is exposed. Short-term exposure typically refers to contact with a contaminant by breathing it in, eating or drinking it, or touching it to your skin or eyes for a short period of time, less than one year. Long-term exposure typically refers to contact with a contaminant for more than one year^{21,22,24}. Short-term health effects also called acute health effects are conditions, symptoms, or health changes that may occur immediately or shortly after exposure and last for less than two to three weeks^{21,22,24}. Long-term health effects also called chronic health effects are conditions, symptoms, or health changes that can occur at some time after exposure and can last for months or years. Short term health effects can occur from exposure to high or low amounts of chemical contaminants. Short term health effects can also occur from short- or long-term exposures. Most long term health effects however, result from repeated exposures to a chemical that occur over and over again²¹.

Health information collected all over the county show that firefighters may experience both reversible, short-term health effects, such as eye and respiratory tract irritation and long-term adverse health effects, such as decreased lung function, and increased incidence of respiratory illness^{28,29,30}. Long-term adverse health effects have been seen in a small portion of firefighters who were exposed to fire components on a daily basis for more than one year^{30,31,32}. Data from studies shows that between one and 10% of firefighters have exposures to fire and smoke components which exceed recommended Time Weighted Average for a normal 8-hour day/ 40 hour workweek. Less than 5% of these smoke exposures exceed Occupational Safety and Health Administration (OSHA) permissible exposure limits which are less stringent than the recommended limits, but which are legally applicable to federal agencies³². The exposures of firefighters to smoke and fire components have been identified by both the respired air from the lungs of firefighters and from actual air samples collected by monitors worn on the neck and chest of firefighters. Reports of studies conducted since 1988 show consistent results. In several studies, firefighters, who were given questionnaires after days of exposure, reported headaches, cough, shortness of breath, lightheadedness and wheezing^{18,19,30,31}.

ATSDR spoke with county nurses in each of three counties from Montana, Idaho, and Wyoming to provide information about health problems reported in the general population affected by the fires this past summer. Health warnings to limit time outside were distributed by newspaper, television, and radio and posted in grocery stores and post offices. Most of the fire and smoke related cases reported eye, nose, and throat irritation that subsided within a few hours after exposures stopped. None of the county nurses reported adverse pregnancy or birth outcomes related to the fire and smoke. Most phone calls the counties received were not related to health, but to how to get the smell of smoke out of the furniture and carpeting³³⁻³⁸.

Hunters Point Naval Shipyard Parcel E Landfill Fire

August 16, 2000 was an unusually hot summer day in San Francisco with temperatures reaching 93 degrees⁶. Many homes in the area do not have air conditioning because summers in San Francisco are typically mild. So it is likely that many homes had their windows open, which is probably the way most people were exposed to the release of components from the Parcel E fire.

The fire at the Hunters Point Shipyard Parcel E Landfill lasted for six hours with small amounts of release occurring during the smoldering, which lasted for one month⁵. Wind rose information collected on Parcel B of the facility corresponds with that collected at the San Francisco Airport, Oakland Airport, and San Francisco Physical Oceanographic Real-Time System. All data show that for the six hour period during the fire air flow direction was toward the bay and away from the Bayview Hunters Point Community¹⁷. Wind rose information provides predominant wind direction over a specific period of time. In this case, the wind rose information shows that the wind may have blown fire components away from citizens. However, topography, and other factors play a part in whether the fire components could have reached inland, up wind areas. Citizens have reported that the smoke swirled up toward the community. Therefore, exposure to fire and smoke components were possible.

Information about the duration of the Hunters Point Shipyard Parcel E landfill fire and meteorological data suggest that the contaminant levels of the Parcel E Landfill fire to which people were exposed would be less than typical exposures to firefighters across the country. The duration of the Parcel E landfill fire was less than one day and reportedly estimated to be six hours and covered an area of 14 acres as compared to the wildland fires we researched which last weeks to months and envelop millions of acres. The information from the wildland fires of Montana, Wyoming, Washington, California, Idaho, and Oregon, show that even after months of exposure of a community to visible smoke, reversible short-term health effects were reported^{18-20,23,24,27-29}. This information provides a "worst case" scenario as to the possible chemicals and physical components released and also the worst possible health effects that might occur in the Bayview/Hunters Point community.

Evaluation of the Hunters Point Parcel E Landfill information, such as the duration of the fire and smoldering events, the land area involved, the wind direction, wind speed, ambient air temperature and photographic information of the fire indicate that adverse health effects, such as eye and respiratory irritation are possible. This also suggests that pre-existing conditions such as asthma and emphysema, could be exacerbated by the fire and smoke components. Children with asthma, adult asthmatics, and elderly adults with respiratory conditions are more highly sensitive to poor air quality. The available study information strongly indicates that long term adverse health effects such as insufficient tissue oxygenation, increase risk of cancer, and irreversible adverse health effects are unlikely. Additionally, adverse effects on the unborn children of pregnant women exposed to the fire and smoldering events are also unlikely.

Human Exposure to Measured Contaminants

One air sample was collected from the smoldering area on September 1, 2000. Continuous 24-hour per day air sampling began September 8, 2000 at six air monitoring stations surrounding Parcel E Landfill. Air samples collected after the fire was contained and during the smoldering events were fully analyzed to adequately characterize the fire and smoke components. Analysis included particulates, pesticides, polychlorinated biphenyls (PCBs), semivolatile organic compounds, volatile organic compounds, metals, dioxin and furans, chlorine and hydrogen chloride, phosgene, and radioactivity. The analysis allowed for determination as to whether the fire extended only to the surface brush or also included toxic components of the landfill. Even though the actual smoke from the active fire was not sampled, sufficient information is available about the deposition of contaminants onto the soil, surface water, and those extracted from the soil to provide a scientific significant representation of the components of the fire. Additionally, air sampling information collected indicated the contaminant levels to which people are currently exposed.

Since sampling began on August 31, 2000, no chemicals have been detected at the Parcel E landfill at levels likely to result in adverse health effects in the surrounding Bayview/Hunters Point community. Results of all the air samples collected are presented by the Navy and posted on their web site <http://w4.efds.w.navy.mil/dep/HP/HntPt/indexHP.htm>. ATSDR reviewed the data collected at the Parcel E air monitoring stations since sampling began in August 2000. Air monitoring stations have detected low levels of PCBs (Aroclor 1260), the pesticide endrin, dioxin/furans, benzene, bis-2-ethylhexyl phthalate, chloroform, trimethylbenzene, and manganese in one or more samples from the Parcel E stations³⁹. Table 1 details the summary of sampling data and ATSDR's evaluation.

Manganese and benzene are the two chemicals which have exceeded ambient air quality standards on several different days since sampling began 15 days after the fire was contained⁴⁰. No other chemical was above air quality standards and all are well below levels likely to cause adverse health effects.

ATSDR reviewed the toxicological information about these chemicals to determine if the levels currently detected are likely to result in adverse health effects in both the general population and in those people who may be hypersensitive or predisposed to respiratory complications.

Assumptions

In our evaluation of the likelihood of people in the Hunters Point Bayview Community to experience adverse health effects, ATSDR made assumptions that would tend to overestimate the level of hazard and level of exposure. The rationale for doing this is because there are no data that documents the actual chemicals to which people were exposed during the fire. This overestimation errs on the side of prudent public health practice while still based on sound scientific evidence. In this evaluation, ATSDR assumed that chemical and particulates released from the fire at Parcel E Landfill included similar components as those released from other fires including landfill fires, railroad tie fires, vegetative fires, wildland fires, and forest fires. Additionally, ATSDR assumed that smoke was coming into the community. Information collected from meteorological stations, photographs, and video of the actual fire show smoke blowing away from community. Our assumptions would tend to overestimate the amount of chemicals and particulates to which people would actually be exposed. Since the time of the fire was 11:30 am to approximately 5:30 pm, ATSDR assumed that children and adults would be outside of their homes. This assumption would also tend toward a worst case exposure.

Benzene

ATSDR has evaluated the likelihood of exposures here to cause adverse health effects in children and adults breathing releases from the Parcel E Landfill. Benzene was detected in outdoor air at all sampling stations surround Parcel E landfill. The maximum benzene level detected was 0.00143 ppm (4.63 ug/m³). A review of the available scientific literature indicates that levels of benzene 30 times higher than those detected here have not been shown to cause adverse health effects. The No Observed Adverse Effect Level (NOAEL) for benzene was determined to be 0.031 ppm a level 34 times higher than that detected at the landfill⁴¹. A newly released study, which sampled "prefueling" breath levels of benzene that represent benzene exposures while driving in your car, showed average levels of 0.003 ppm and ranged from less than 0.001 - 0.022 ppm⁴². Levels (700-3,000 ppm) can cause drowsiness, dizziness, rapid heart rate, headaches, tremors, confusion, and unconsciousness. In most cases, people will stop feeling these effects when they stop being exposed and begin to breathe fresh air⁴⁴⁻⁴⁶.

During the 1990s, several large-scale studies of benzene concentrations in air, food, and blood have added to our knowledge of its widespread presence in the environment. The new studies have confirmed earlier findings of the U.S. Environmental Protection Agency studies and other large-scale studies in Germany and the Netherlands about the levels of human exposure and major sources. The new studies found that indoor concentrations were generally higher than outdoor concentrations. Major sources of exposure continue to be active and passive smoking, auto exhaust, and driving or riding in automobiles⁴¹.

Manganese

Manganese is a natural component in the environment, present at low levels in water, air, soil, and food. In drinking water, natural levels are usually about 0.004 ppm. In air, levels are usually about 0.087 ppm. Levels in soil range from 40 to 900 ppm^{47,48}. Manganese is also a normal component of living things, including both plants and animals, so manganese is present in foods. For nearly all people, food is the main source of manganese, and usual daily intakes range from about 2,000 to 9,000 ppm. The exact amount taken in depends on a person's diet^{47,48}.

The maximum level of manganese detected from air monitoring stations after the fire was contained was 0.0001 ppm (0.294 ug/m³). This level is 400 times lower than the Lowest Observed Adverse Effect Level of 0.04 ppm⁴⁹. Therefore, current levels of manganese are not likely to result in adverse health effects.

COMMUNITY HEALTH CONCERNS

If I smelled smoke, am I going to have health problems as a result?

Not necessarily. Being able to smell smoke is based on its odor threshold. A chemical's odor threshold is the lowest concentration of that chemical in air that people can smell. The concentration of many chemicals that emit detectable odors is much lower (often 10 to 1000 times lower) than the amount of chemical likely to cause health problems. Even though people differ, some health conditions such as asthma may be triggered by certain odors even though the concentration of chemical is much lower than could cause a toxic effect.

Without sampling data collected during the fire, how do you know the fire was not a "toxic fire?"

ATSDR assumed that the fire burned "toxic" or harmful materials such as railroad ties as well as sawdust, brush, and grasses. Because there was not sampling data collected during the fire, we used existing information from other landfill fires, railroad tie fires, and forest fires to predict whether people were likely to experience health problems from breathing the components released by the Hunters Point Shipyard Parcel E Landfill fire. Although the fire would have been "toxic," the effects would be of short duration.

How do you know the health problems of people in the Bayview Hunters Point community are short-term?

The reason we believe that health effects will be short-term is based on ATSDR's review of the scientific literature including medical reports and other information which detail 1) the chemicals that could have been released by the fire 2) the likely health effects from those chemicals, and 3) the health effects seen in firefighters and in communities near various types of fires. The fire information we reviewed included details about landfill fires, railroad tie fires, and forest fires. Reports of human exposure to fire components under similar circumstances lasting less than one year showed only short-term health effects. No long-term health effects were reported. Based on the duration and extent of the fire, distance of the fire from the community, and most frequent wind direction, our conclusion is that people breathing the components released by the Hunters Point Shipyard Parcel E Landfill fire may have experienced health problems such as burning, itching or watery eyes and sinuses, headache, nausea, breathing difficulty, and asthma-like symptoms which could have begun within a few days after exposure and lasted no more than two to three weeks.

Is there a fire currently burning underground in the Parcel E landfill?

Air monitoring stations, which have been collecting data for 24 hours a day since September 8, 2000, have not detected any of the components which would be released from an underground fire. On September 22, 2000, the Navy made a thermal image of the area, which did not show any hot spots on the surface of the burned area. As a final measure to ensure that there are no remaining subsurface smoldering areas, the Navy is conducting subsurface monitoring of temperature and fixed gas concentrations. Preliminary results indicate that there is no continued subsurface smoldering. A final report is expected by March 2001.

Have there been landfill fires at Hunters Point Shipyard before?

The Navy told ATSDR that there have not been any other fires on the Parcel E landfill in the past. However, there have been fires in other areas of the Hunters Point Shipyard such as grass fires, empty metal fuel tanks, and fires in buildings. None of the previous fires was this large and therefore, they should not have long-term effects to the off-site community. However, we are recommending that future air releases be reported to the community the same day.

If the current chemical contaminant levels from Parcel E are safe, why does the Bayview/Hunters Point community have so many health problems?

Numerous city, state, and federal health care groups are working to determine why the Bayview/Hunters Point community has so many health problems, but it is not known at this time. It is a widely reported fact that the Bayview/Hunters Point community has higher than average incidence of asthma, respiratory disease, diabetes, lung cancer and other health problems. However, the rates here are similar to other urban communities with numerous industries and similar economic and demographic make-up. No one factor has been shown to be the cause, but could be a combination of factors such as exposure to industrial pollutants, access to medical care, lifestyle and dietary factors.

How can the situation change so that in the future the community is informed of similar events?

The Navy along with community members, U.S. EPA, and local agencies, began meeting approximately every three weeks to discuss and develop notification procedures for the community in case of future events.

For More Information

Your questions and comments are important to ATSDR and should be directed to Bill Nelson, ATSDR Regional Representative, at 415-744-2194. You can also contact our Atlanta office, toll free, at 1-888-42-ATSDR (1-888-422-8737). Please refer to Hunters Point when asking to speak with a health assessor in the Division of Health Assessment and Consultation.

CONCLUSIONS

1. Components (chemical and physical) released from the fire on August 16 could have caused short-term adverse health effects in those people exposed. Health effects could include burning, itching or watery eyes and sinuses, headache, nausea, breathing difficulty and asthma-like symptoms. Individuals highly sensitive to the effects would be anyone with previous respiratory conditions such as asthma or emphysema, children, and the elderly. Health effects would be of short duration: developing within a few days of exposure and lasting no more than two or three weeks after exposure stopped. The Bayview/Hunters Point community already has a high incidence of respiratory diseases.
2. Long-term health effects such as decreased lung function, increase in cancer risk, and insufficient tissue oxygenation are unlikely to be seen in people who were exposed to components released from the Parcel E landfill fire because the length of time people would have been exposed was short and the concentrations were low. Additionally, the unborn children of pregnant women who were exposed are unlikely to experience any adverse health effects as a result of their exposure.
3. Air sampling data collected 15 days after the fire was extinguished, but during the smoldering and since that time do not indicate a release of chemical or physical components likely to result in adverse health effects.

RECOMMENDATIONS

1. If people are experiencing respiratory problems, they should seek the attention of their personal medical care provider.
2. Because the community near the boundary of Hunters Point Shipyard has higher than average rates of respiratory disease, the Navy should take extra precautionary measures to reduce particulates and chemicals that may be stirred up or released during cleanup activities on base. ATSDR also recommends that the Navy conduct air monitoring during planned events which are likely to release particulates or chemicals into the air.
3. As a way of reducing exposures to this vulnerable population, ATSDR recommends that the Navy notify the Bayview/Hunters Point community of any planned or unplanned air releases that have the potential to move off base.

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Table 1 - Summary of Parcel E Landfill Air Monitoring Data and ATSDR's Evaluation

Chemical Component	Maximum Concentration (ug/m3)	Minimum Concentration (ug/m3)	Mean Concentration (ug/m3)	Modeled Exposure Concentration	Comparison Concentraion (ug/m3)	ATSDR Hazard Evaluation
1,2,4-Trimethylbenzene	77.2	2.56	39.88	0.772	6.2	No Hazard
1,3,5-Trimethylbenzene	13.7	13.7	13.7	0.137	6.2	No Hazard
Acenaphthene	0.00512	0.00301	0.004065	0.0000512	220	No Hazard
Anthracene	0.00563	0.003	0.004315	0.0000563	1100	No Hazard
Aroclor 1260 (PCB)	0.0432	0.0121	0.0136	0.000432	0.0031	No Hazard
Benzene	4.63	0.415	1.17	0.0463	0.22	No Hazard
Bis(2-ethylhexyl)phthalate	0.744	0.00355	0.024	0.00744	0.45	No Hazard
Cobalt	0.012	0.012	0.012	0.00012	220	No Hazard
Carbon Tetrachloride	0.629	0.0629	0.34595	0.00629	0.12	No Hazard
Chloroform	1.22	1.17	1.195	0.0122	0.077	No Hazard
Copper	0.442	0.0184	0.2302	0.00442	150	No Hazard
Dibenzofuran	0.0534	0.00385	0.028625	0.000534	15	No Hazard
Dichlorodifluoromethane	2.72	1.09	1.905	0.0272	180	No Hazard
Diethylphthalate	0.0586	0.00406	0.03133	0.000586	2900	No Hazard
Di-N-Butylphthalate	0.0729	0.00696	0.03993	0.000729	370	No Hazard
Endrin	0.583	0.0012	0.2921	0.00583	1.1	No Hazard
Ethylbenzene	1.78	0.478	1.129	0.0178	1100	No Hazard
Fluoranthene	0.00799	0.00307	0.00553	0.0000799	150	No Hazard
Fluorene	0.00907	0.00620	0.007635	0.0000907	150	No Hazard
Lead	0.216	0.029	0.1225	0.00216	1.5	No Hazard
Manganese	0.294	0.05	0.172	0.00294	0.052	No Hazard
Methylene Chloride	1.84	1.74	1.79	0.0184	3.8	No Hazard
Phenanthrene	0.0415	0.00321	0.022355	0.000415	54	No Hazard
Styrene	5.92	0.469	3.1945	0.0592	1000	No Hazard
Tetrachloroethene	0.814	0.678	0.746	0.00814	0.031	No Hazard
Toluene	9.31	0.754	5.032	0.0931	420	No Hazard
Trichlorofluoromethane	2.47	1.12	1.795	0.0247	730	No Hazard
Xylene, Total (a)	26.5	0.868	13.684	0.265	7300	No Hazard

This table lists chemicals that have been detected at some time during sampling. Modeled Exposure Concentrations are air contaminant concentrations (not dose) to which people could be exposed and are based on mathematical model results that show less than 1% of maximum concentrations that would be expected to be released outside the base into the community. Comparison Concentrations are EPA's Region III Risk Based Concentration screening values. For lead, the California State Action Level. The complete list of chemicals analyzed but not detected are not included in this table. Complete data is contained at the Navy's web site at <http://w4.efds.w.navy.mil/dep/HP/HntPt/indexHP.htm>

Figure 1



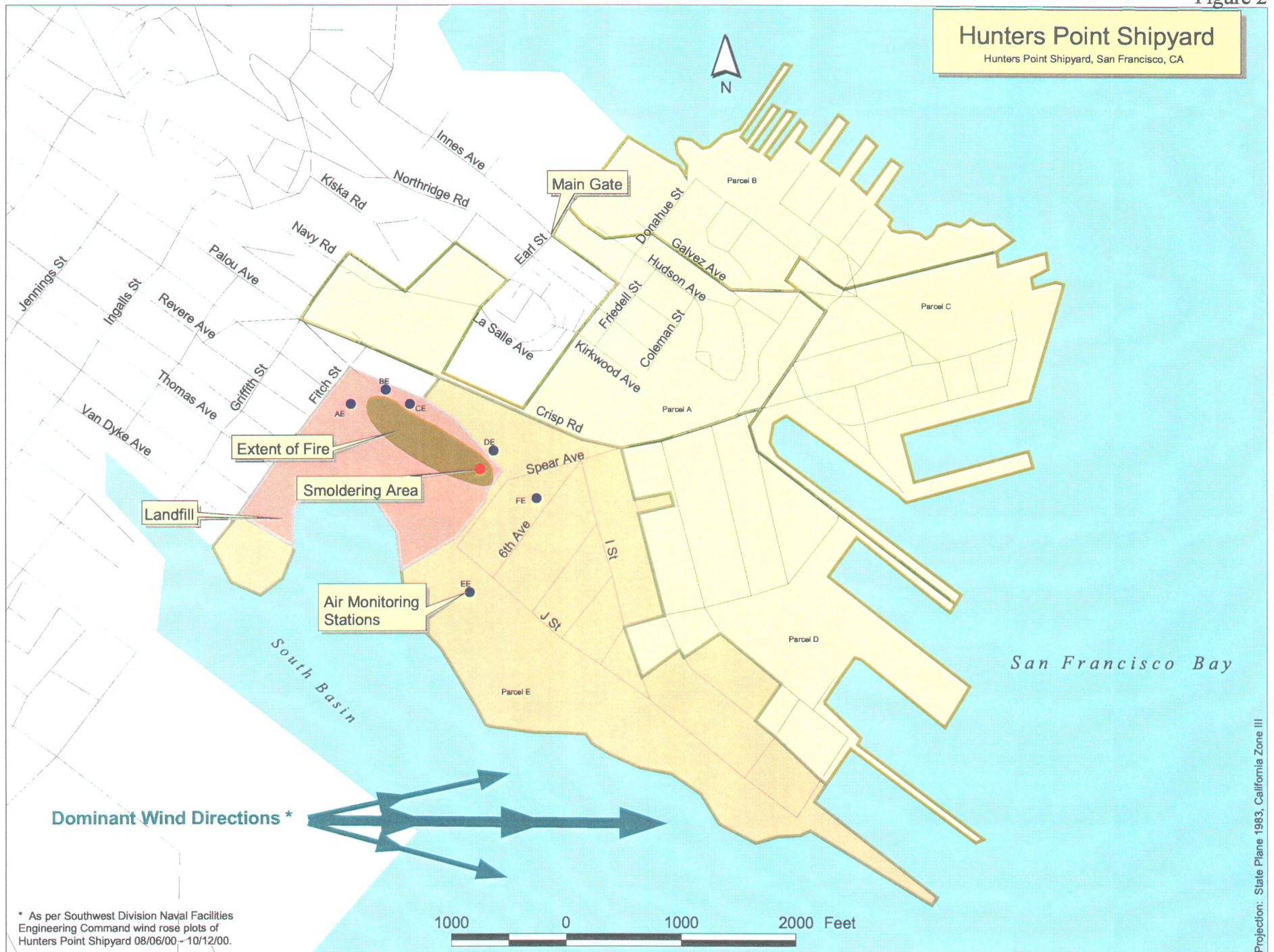
Hunters Point Shipyard

San Francisco, CA

VICINITY MAP



Figure 2



* As per Southwest Division Naval Facilities Engineering Command wind rose plots of Hunters Point Shipyard 08/06/00 - 10/12/00.

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Hunters Point Shipyard

San Francisco, California

INTRO MAP



Base Map Source: 1995 TIGER/Line Files

Site Location



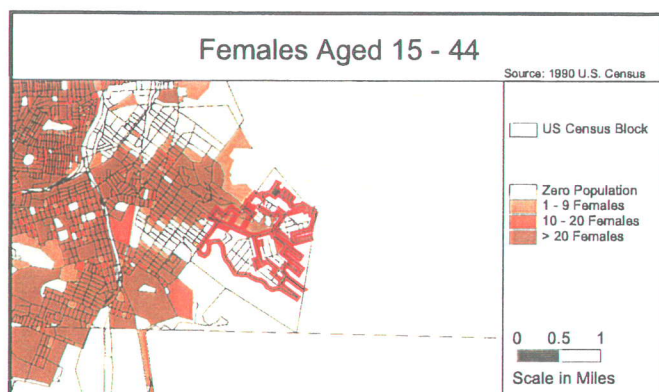
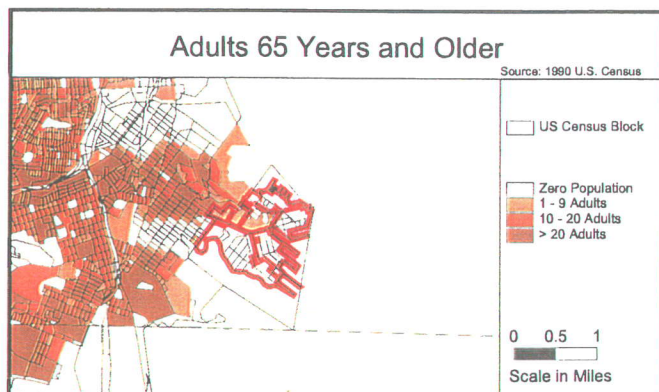
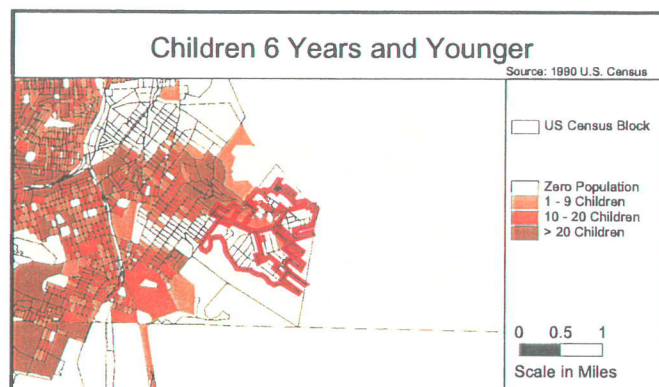
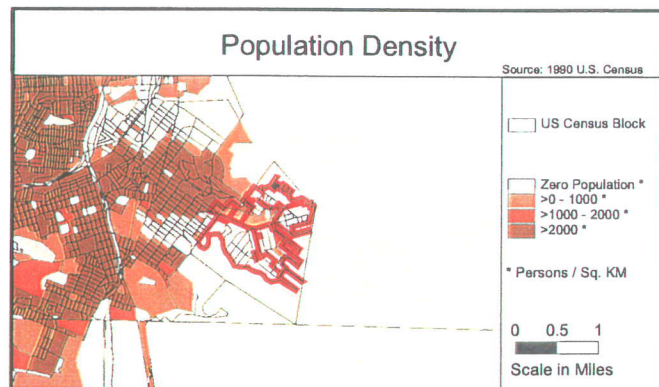
San Francisco County, California

Demographic Statistics Within Zipcode of Site*

Total Population	27134
White	3084
Black	17338
American Indian, Eskimo, Aleut	104
Asian or Pacific Islander	5388
Other Race	1219
Hispanic Origin	2541
Children Aged 6 and Younger	3122
Adults Aged 65 and Older	3343
Females Aged 15 - 44	6424
Total Housing Units	8875

Demographics Statistics Source: 1990 US Census

*Calculated using an area-proportion spatial analysis technique

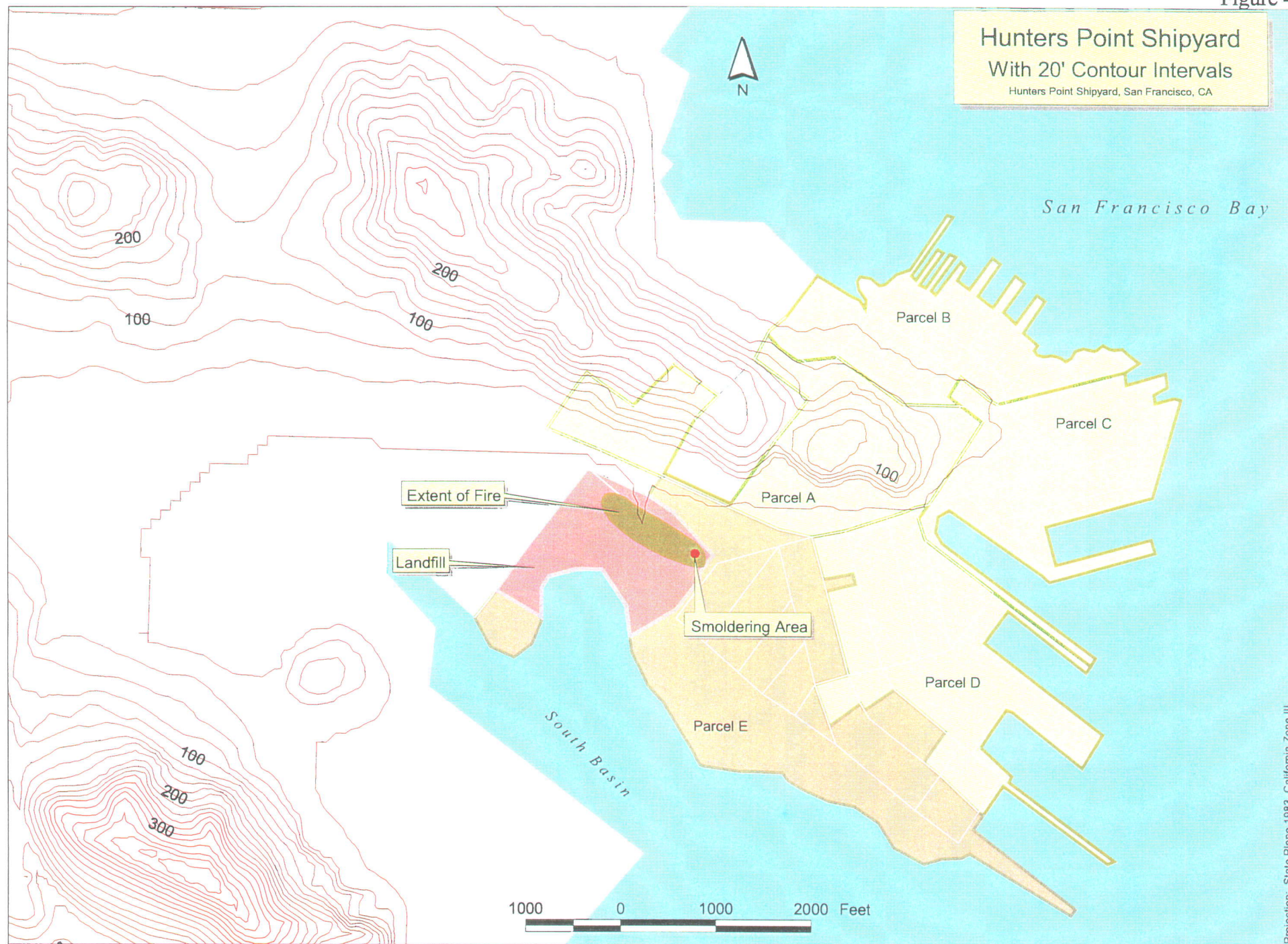


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ATSDR SAAIGIS

Figure 3

Figure 4



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Projection: State Plane 1983, California Zone III

Figure 5



* As per Southwest Division Naval Facilities Engineering Command wind rose plots of Hunters Point Shipyard 08/06/00 - 10/12/00.

ksl022301

Figure 6

